MINI-COURSE ON MONETARY ECONOMICS FOR THE BUNDESBANK RESEARCH DEPARTMENT

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1. Course Introduction

The course aims to provide some of the background necessary to understand current and future issues in monetary policy analysis.

1.1. Current Issues. Current issues are typically couched in terms of dynamic stochastic general equilibrium models with nominal rigidities, often referred to as “New Keynesian” models. The workhorse model is a three-equation system that can easily be manipulated analytically and numerically.

Where does that system of equations come from? The course begins with an overview of general equilibrium monetary models, deriving some fundamental results about steady states and equilibrium time paths. With the inclusion of capital accumulation and/or elastic labor supply, these models are simply monetary versions of the canonical real business cycle setup. In their basic form, these models deliver implications that are contrary to conventional wisdom and empirical evidence. For example, the basic models imply that a serially correlated expansion in the growth rate of the model supply raises the nominal interest rate and reduces output. Extensions of the models that retain the assumption that wages and prices are perfectly flexible and determined in competitive spot markets do not deliver quantitatively believable results.

Research over the past decade or so has focused on various schemes for bringing the predictions of general equilibrium monetary models in line with empirical evidence. The most popular scheme dispenses with the assumption of perfect competition in goods or labor markets and then assumes the presence of nominal rigidities. The simplest variant assumes monopolistically competitive goods markets, so that firms are price setters. But firms are not free to adjust their prices every period. When this market structure and pricing behavior are embedded in an otherwise standard monetary model with elastic labor supply, the result is a simple dynamic, stochastic model with three equations. The first—an “IS” type of relationship—comes from

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the household’s consumption Euler equation and relates current output to expected output and the ex-ante real interest rate. The second—a Phillips curve, or “aggregate supply” equation—comes directly from pricing behavior and relates current inflation to expected inflation and some notion of current demand for goods. The model is typically closed by assuming that monetary policy controls the short-term nominal interest rate and adjusts that rate in response to inflation and a measure of the state of the business cycle. This is the New Keynesian model.

New Keynesian models have become the workhorse for monetary policy analysis. They have formed the basis for studies of the operating characteristics of various policy rules, of descriptions of optimal monetary policy, of presentations conceptual frameworks for inflation targeting, and even of estimated econometric models. More complicated versions of these estimated dynamic stochastic general equilibrium models are now in use in several central banks around the world.

Much current research continues to have at its core some version of the basic New Keynesian model. Because that is a model designed to study only monetary policy, it cannot be applied to analyze future issues without significant alterations that give fiscal policy a non-trivial role.

1.2. Future Issues. Future issues—and here I am using my judgment to forecast what set of issues will be most pressing in the future—will center on interactions between monetary and fiscal policies. This forecast is based on the observation that in many countries fiscal forces are likely to become more pressing over the next few decades. A few examples include: world-wide demographic shifts that imply aging populations and the consequent rise in demands for government social programs; the growing consensus that low and stable inflation is a desirable goal of macroeconomic policies suggests there is substantial resistance to generating needed revenues through seigniorage; increased integration and sophistication of financial markets means the dynamic implications of changes in macro policies are likely to be understood and responded to quickly; organized resistance to raising taxes in many countries (especially true of the United States); monetary union(s) imply that each country has less flexibility in monetary policy than in the past. How does explicitly accounting for monetary and fiscal interactions change mainstream monetary analyses?

The first step in this analysis is to move away from the trivialization of fiscal policy that is common in models of monetary policy. Those models usually introduce monetary injections by means of “helicopter drops/sucks” whose fiscal consequences are exactly offset with lump-sum taxes/transfers. Because there is no consequent change in the state of government indebtedness (as there would be from a conventional open-market operation), the usual policy scheme eliminates any dynamic links between
current monetary policy and future monetary/fiscal policies. It should be understood
that this scheme is special and the resulting predictions of the impacts of monetary
policy are equally special. Other, equally or more plausible, schemes can produce
very different monetary impacts.

That monetary and fiscal policies intrinsically interact has been recognized at least
since Friedman (1948) and Hansen (1958). Christ (1967, 1968) showed that the values
of Keynesian “multipliers” in existing models can be quite different once one explicitly
accounts for the existence of a government budget constraint. More than 20 years
ago Tobin (1980) pointed out the implicit fiscal assumptions underlying then-popular
monetary analyses.

Modern work on monetary/fiscal policy interactions really begins with Sargent
and Wallace (1981). That paper was the first to explore the potentially dramatic
implications that can arise when fiscal behavior imposes restrictions on monetary
policy. Their analysis emphasizes the intertemporal implications that have become
the hallmark of modern macroeconomics. The “fiscal theory of the price level” can be
construed as another application of the implications of fiscal restrictions on monetary
policy, though the mechanism by which fiscal disturbances affect the economy is very
different from Sargent and Wallace’s mechanism. The course will explore these issues,
including some exploration of how the nature of equilibrium is altered when monetary
and fiscal policy regimes are subject to recurring change.

1.3. Background. The lectures will presume familiarity with general equilibrium
models of the real business cycle variety, and well as familiarity with techniques
like dynamic programming, Kuhn-Tucker lagrangian methods, linearization of dy-
namic stochastic model, and methods for solving linear rational expectations models.
Economists whose backgrounds do not include all of these techniques can nonetheless
follow the economic content of the mini-course.

2. Readings

There are now several good textbooks that deal with monetary economics. In
increasing order of technical difficulty, three such books are: Walsh (2003), Woodford
(2003), and Ljungqvist and Sargent (2004). Some of the following readings will come
from these texts. Walsh offers a broad overview of monetary theory and policy, but
suffers from the fact that his general equilibrium monetary models are linearized
before a rich set of analytical implications are extracted. Woodford pushes analytical
methods very far, but it is by no means a survey of the literature. Instead, it is
narrowly focused on the models currently in use for policy analysis. Ljungqvist and
Sargent is a broad overview of macroeconomic research. Their chapter on “Monetary Doctrines” is especially useful for our purposes.

2.1. **Classic Papers.** These are papers that at some point every monetary economist should read. I include largely for background, as I will not explicitly discuss them.


2.2. **Empirical Surveys.** These papers use identified vector autoregressions to obtain a set of empirical facts about monetary policy and about fiscal policy. Unfortunately, none of these considers monetary and fiscal policies jointly. No existing empirical work connects well with the theoretical literature on interactions. I will refer to, but not directly present, these papers.

Walsh (2003, chapter 1); Gordon and Leeper (1994); Leeper, Sims, and Zha (1996); Christiano, Eichenbaum, and Evans (1999); Leeper and Roush (2003); Blanchard and Perotti (2002); Perotti (2004); Mountford and Uhlig (2002).

2.3. **General Equilibrium Models of Money.** There are a variety of methods that researchers have put money into general equilibrium models with complete Arrow-Debreu contingent claims markets. What follows is a sampling of those methods.


2.3.2. *Cash-in-Advance.* Walsh (2003, chapter 3); Stockman (1981); Lucas and Stokey (1987); Sargent (1987, chapter 5).

2.3.3. *Transactions Costs and Shopping Time.* Walsh (2003, chapter 3); Feenstra (1986); Sims (1989); McCallum and Goodfriend (1987).

2.3.4. *Limited Participation and the Credit Channel of Monetary Policy.* Walsh (2003, chapters 5.2 and 7); Friedman (1968a); Leeper and Gordon (1992); Fuerst (1992); Christiano (1991); Nason and Cogley (1994); Evans and Marshall (1998).

2.4. **Interest Rate Rules for Monetary Policy.** Taylor (1993); Kerr and King (1996); King and Wolman (1996); Woodford (2003, Part I, Section 2, pp. 61-138); Alvarez, Lucas, and Weber (2001).
2.5. Monetary Models with Nominal Rigidities.


There are now many excellent introductions to the canonical New Keynesian model. Many of these exist only as lecture notes available on the internet. With some careful searching using Google, under key words like “new keynesian,” “general equilibrium models,” “nominal rigidities,” “sticky prices,” among others, you can find some useful notes.

2.5.2. The Canonical New Keynesian Model. Walsh (2003, chapter 5); Calvo (1983); Yun (1996); Clarida, Gali, and Gertler (1999, 2000); Woodford (2003, Part I, Sections 3-4, pp. 139-319); Gali (2002); Chari, Kehoe, and McGrattan (2000); King (2000).


References


